FALL FORECAST FOR SOUTHWEST LOWER MICHGIAN

By William Marino

The forecast for the fall of 2012 for Southwest Lower Michigan is for a 49 percent chance of above normal temperatures, a 32 percent chance of near normal temperatures and 19 percent chance for below normal temperatures (Figure 1).

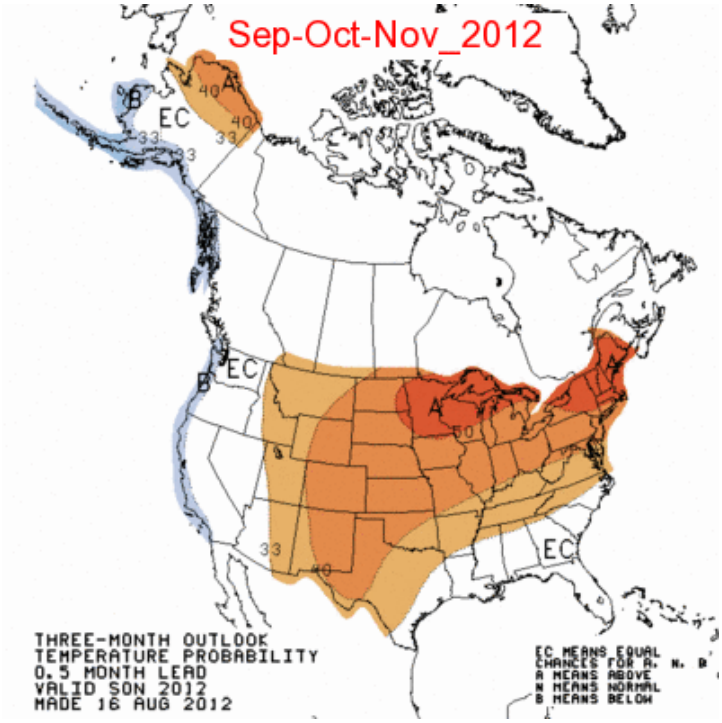

Figure 1. The CPC fall temperature anomaly forecast for 2012.

Temperature Forecast

The temperature forecast for the fall of 2012 is based on a combination of computer model projections, the trend over the past 10 years with some consideration to the ENSO impacts and AMO (Atlantic Maridional Oscillation). The trend (Figure 2) shows a trend toward warmer falls. The forecast from numerous models, consolidated together (Figure 3), shows warmer than normal temperatures have a higher probably than colder than normal temperatures for this coming fall. Also, for the seven years, 1898, 1921, 1930, 1953, 1998, 1999 and 2007 that the winter, spring and summer each averages above normal for the entire County Warning Area, consecutively, none of those falls were cooler than normal. When the AMO is in the positive phase (which it is) there is a statistically significant correlations to warm falls (Figure 4). Based on all of these considerations, it is with higher than normal confidence that we are forecasting the fall of 2012 to be warmer than normal.

Over the past 10 years, there was only one fall that was colder than normal (2006), five were warmer than normal, while four were near normal. This goes along with the trend CPC calculated for the fall over Southwest Lower Michigan (Figure 2), which also shows a trend toward warmer falls in the past 10 years.

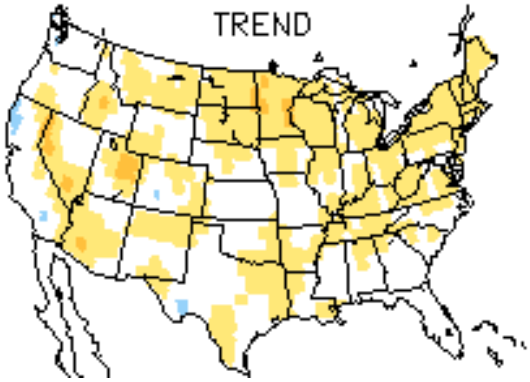

Figure 2. The fall temperature trend over the past 10 years.

The consolidation forecast from CPC (Figure 4) indicates there is a between 37% and 50% probability of above normal temperatures over Southwest Lower Michigan for the fall. This forecast is based on both statistical models and global ensemble models correlations and typically has higher skill than does the actual CPC seasonal forecast.

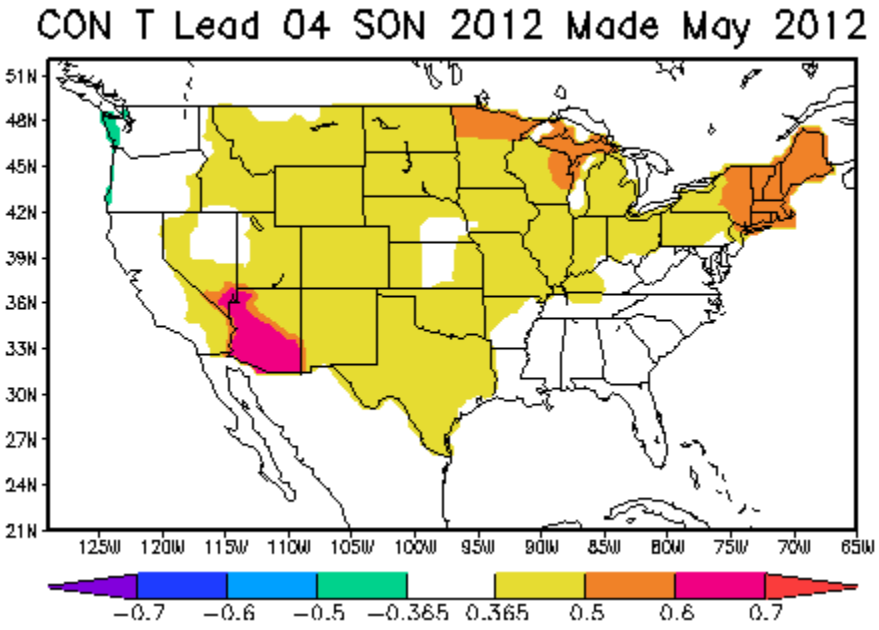

Figure 3. The CPC consolidation forecast for the fall of 2012.

The phase of the Atlantic Maridional Oscillation (AMO) is more significant for Southwest Michigan weather than is the state of ENSO. The AMO has been in its positive phase this summer and continues into the fall. When the AMO is in the positive phase, 45% of the falls are warmer than normal, 20% are near normal and 35% are colder than normal for Southwest Lower Michigan. This is also shown from the

NCEP/NCAR reanalysis correlation, (Figure 4) which shows the correlation number is over 50%. To be statically significant it has to be greater than 36%, which clearly it is.

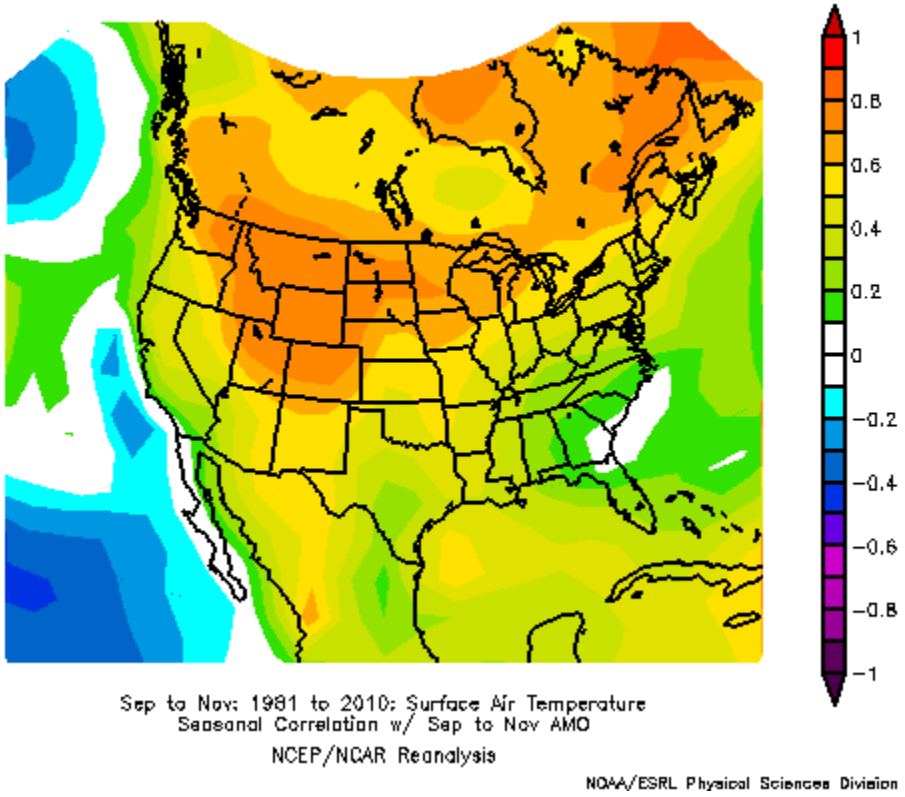

Figure 4 The correlation for the temperature departure from normal for the AMO during the fall.

The El Nino Southern Oscillation (ENSO), which was in the La Nina state for the past two winters, went to neutral this past spring. The latest forecast suggests at least a weak El Nino by this fall and it is expected to continue into this winter. Looking at the outcome since 1950 for ENSO events during the fall, it turns out when there is an El Nino event, the fall is warmer than normal 15% of the time, near normal 45% of the time and is colder than normal 40% of the time (Figure 5). However, it should be pointed out that typically when a La Nina in the winter turns into an El Nino by the summer or early fall, 82 percent of the summers averaged near normal. Clearly that correction did not work this past summer and it is not expected to work this fall either.

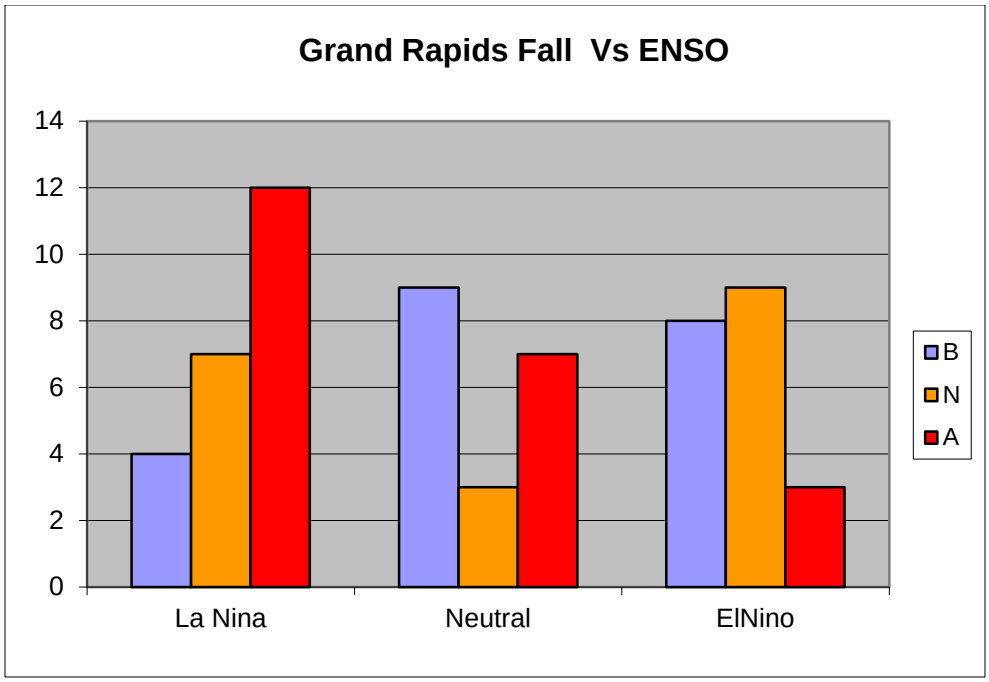

Figure 5 The ENSO correlation for the fall.

Combining the information from the trend, the computer models, warm winters through summer years (7), the ENSO impact, and the AMO impacts, we have fairly high confidence this fall will in the top 1/3 warmest falls (49%). We have a low confidence (19%) this fall will be colder than normal.

Precipitation Forecast

The precipitation forecast is for 33 percent chance of above normal precipitation, a 33 percent chance of near normal and a 33 percent chance of below normal precipitation (Figure 6).

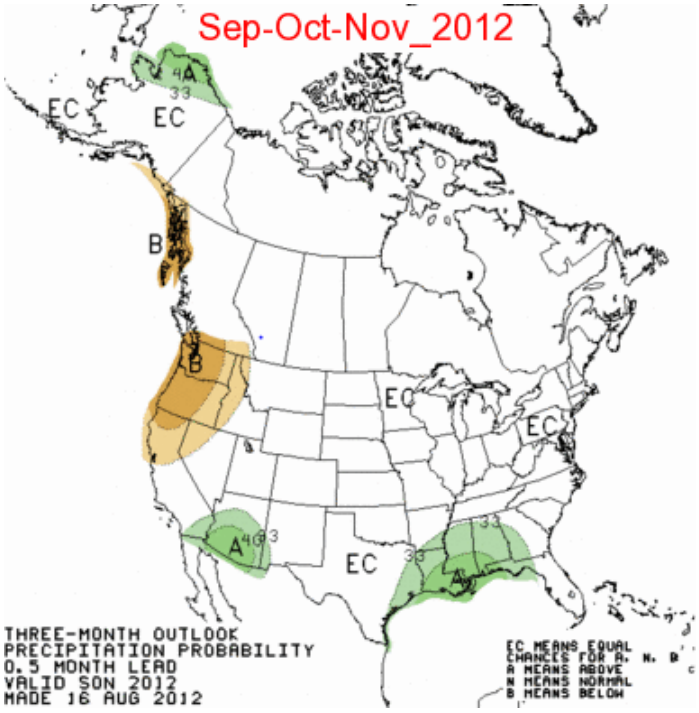

Figure 6. The CPC fall precipitation forecast.

Similar to forecasting the temperature trend, the computer models and the ENSO impacts were all considered. Also considered was the correlation between warm summers and warm falls with the precipitation anomaly. The precipitation trend is strongly toward drier falls (Figure 7). Of the past 15 falls, 10 were drier than normal, 4 were wetter than normal and only 1 was near normal.

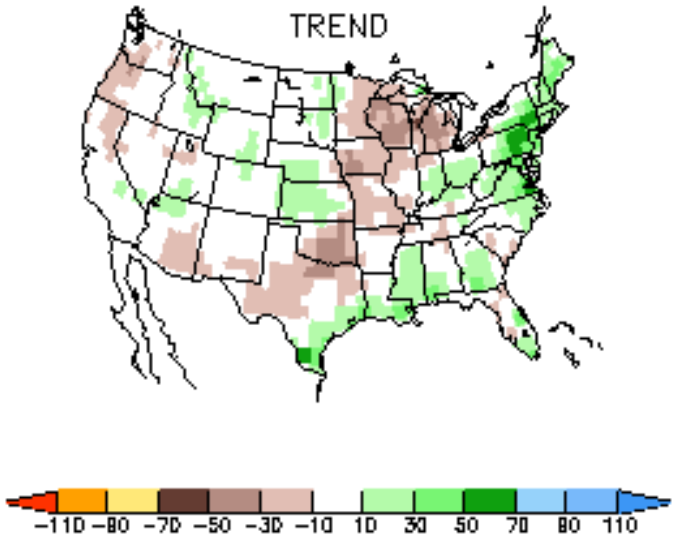

Figure 7. The fall precipitation trend over the past 15 years.

The consolidated computer model forecast for precipitation (Figure 8) shows no trend toward drier or wetter for the fall of 2012 over Southwest Lower Michigan. However when there is an El Nino during the fall (Figure 10), there is not a statistically significant trend for either wetter or drier than normal falls. Of the past 14 El Nino falls, 4 were drier than normal, 5 were wetter than normal and 5 were near normal. Combining the trend toward dry falls with the computer model outcome and the ENSO composite of the trend plus the typical El Nino precipitation composite (Fig. 9), it would seem a dry fall would be the more likely outcome. However due to the consolidate forecast not showing that is a likely outcome our forecast is for an equal chance of above normal, near normal or below normal precipitation.

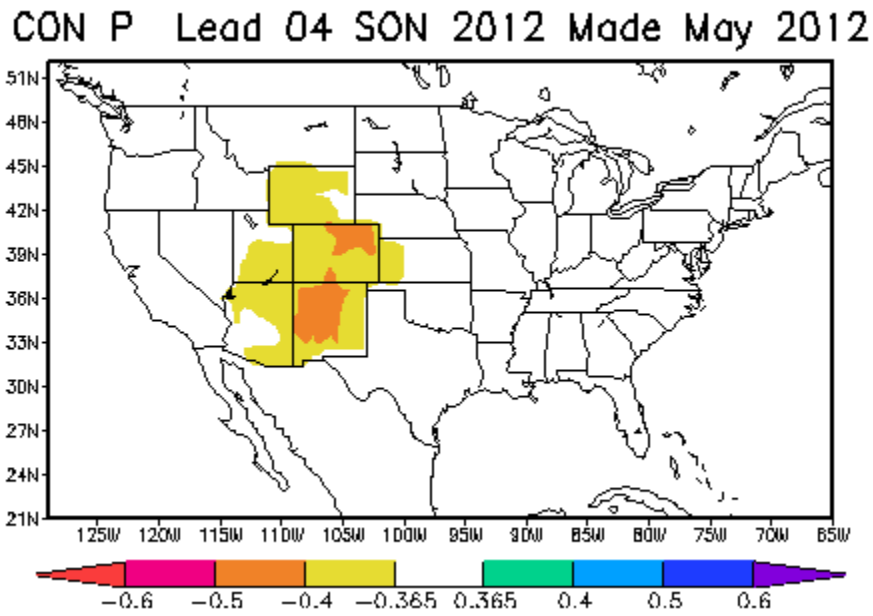

Figure 8. The fall computer model consolidation forecast.

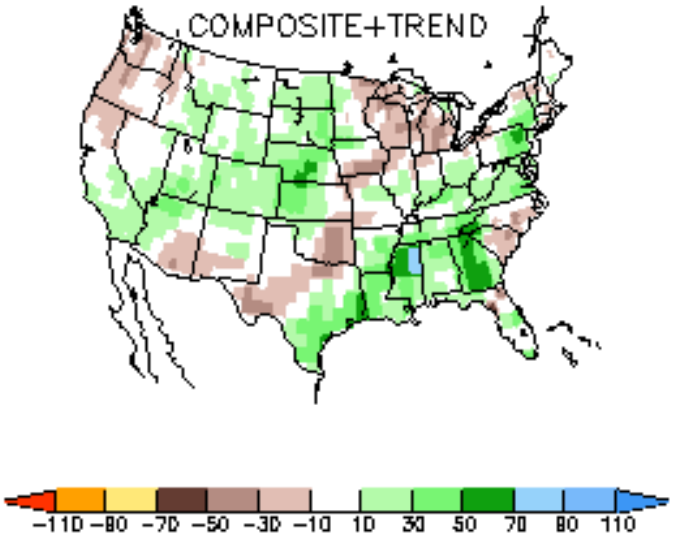

Figure 9. The composite of the El Nino fall precipitation anomaly with the trend.

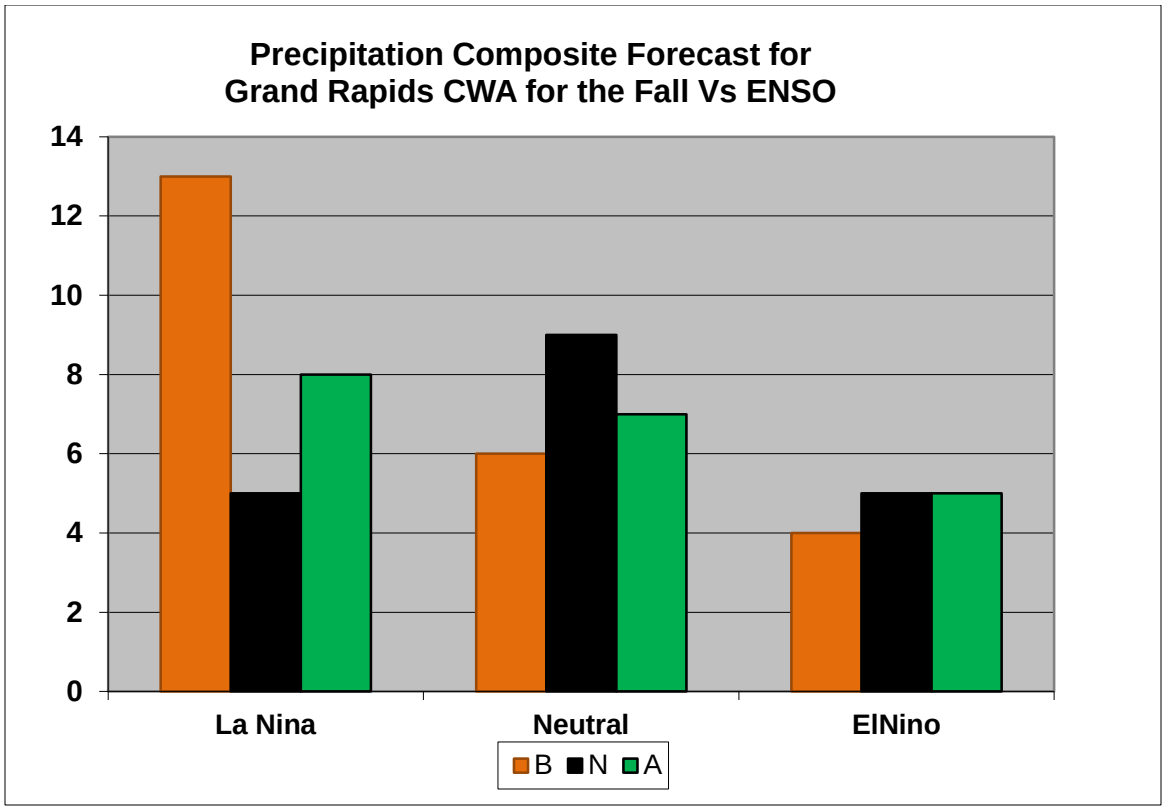

Figure 10. Composite precipitation forecast for the fall.

USEFUL WEB LINKS ON LONG RANGE FORECASTING:

Three month downscaled outlooks for selected cities in Southwest Lower Michigan:

http://www.weather.gov/climate/calendar_outlook.php?wfo=grr

The Climate Prediction Center's (CPC's) forecast:

http://www.cpc.ncep.noaa.gov/products/predictions/90day/

Additional information about past and current climate conditions:

http://www.cpc.ncep.noaa.gov/products/predictions/90day/tools/briefing/

Other CPC forecasts:

http://www.cpc.ncep.noaa.gov/products/predictions/